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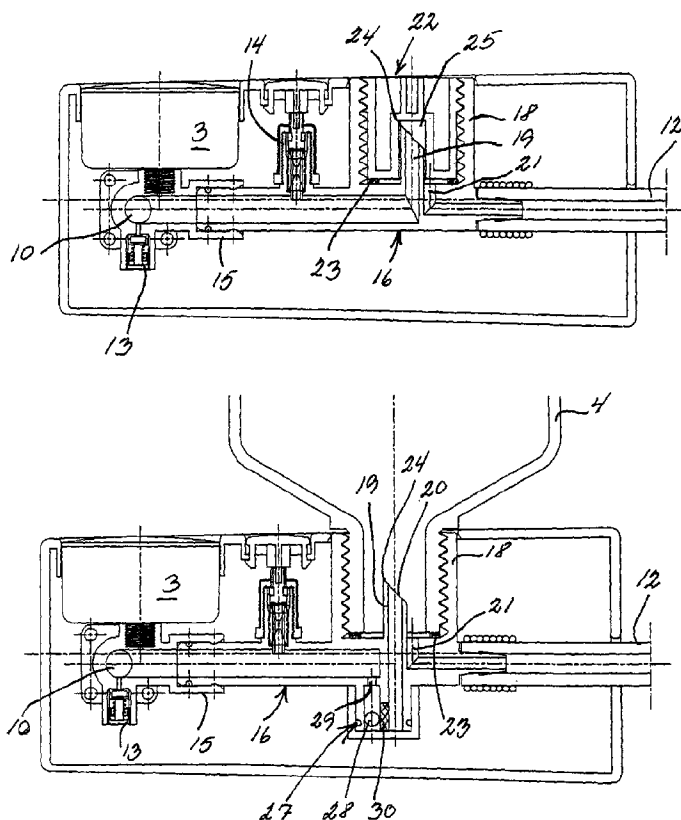
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(54) Title: INFLATING UNIT WITH SEALING FACILITIES FOR A TYRE FILLED WITH AIR



(57) Abstract: A compact combination apparatus for inflating and mending a car tyre comprises a compressor with an outlet (10), where compressed air is lead to a tube (12) for connection to the filling valve of the tyre. In the duct of compressed air, an elbow pipe connector is provided (19), which can break the sealing on a bottle (4) with a sealing material and lead compressed air into the bottle, and by that pressing the sealing material out into the tube (12) through a pipe opening (21) at the end of the opening of the bottle. When the inflating unit is used only for refilling a tyre with air without mending it, a plug is inserted (22) in the socket (18) where the bottle (4) is to be fitted that, thus preventing admission of compressed air to the environment and instead conducting compressed air to the tube (12) through a clearance between a cavity (25) in the plug (22) and the pipe connector (19). According to the invention, a permanently mounted container with sealing material is avoided during normal use where tyres have to be refilled with air, whereby a substantial amount of space is saved.

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Inflating unit with sealing facilities for a tyre filled with air

Background of the invention

The present invention relates to a compact inflating unit with sealing facilities for a tyre filled with air including a source of compressed air, for example an electrically driven compressed air compressor, where a duct for compressed air connects the source of compressed air with a filling connector, which can engage the filling valve of the tyre, as a selector device is inserted between the source of compressed air and the filling connector, where the selector device either can lead the compressed air directly from the source of compressed air to the filling connector or can lead the compressed air through a container with a sealing agent to the filling connector.

Such an apparatus is described in US 4 765 367 and can be used to both refilling air into a car tyre and to mend a tyre puncture. The apparatus is a compact type that can either be carried as an accessory in a car, or mounted in the car without occupying much space.

The container with sealing material is provided separately and is connected to a selector device, which consists of a valve arrangement. The valve has two positions, one of which compressed air is led to and through the container in order to conduct sealing material to the filling connector and thereby to the tyre, and another position where compressed air is led directly to the filling connector.

It is obvious that in practice the refilling function is by far the most used and it is rare that the function for mending a puncture is used. Nevertheless, the container with the sealing material, which constitutes a large part of the whole apparatus, must be carried all the time, among others because the encasing of the container in the apparatus prevents removal of the container.

Object of the invention

It is a main object with the invention to provide an inflating unit, where it is not necessary to carry the container with the sealing material all the time.

Summary of the invention

This is achieved with an inflation unit of the kind mentioned in the introduction, where the selector device is arranged for alternative fastening of the container or an insert, where the insert is attached to the selector device instead of the container with
5 the sealing agent when delivering compressed air directly from the source of compressed air to the tyre, and where the insert is adapted so that it can lead compressed air directly from the source of compressed air to the filling connector.

When the the unit is usen for inflating, the insert is placed in the selector device, and
10 inflating may be effected. When mending a puncture is needed, the insert is substuted with the container containing sealing agent, and mending may be performed. When not in use, the container can be stored somewhere and apart from the inflating unit, so that it is not needed to carried with the unit.

15 In a preferred embodiment of the invention, the container is provided with a neck, which can engage a socket in the inflating unit, for example by a screw connection, and where the socket comprises a perforation member for breaking a sealing in the neck of the container, where the perforation member consists of a sharp edged pipe connector provided as a part of the duct of compressed air and protruding into the
20 socket, and where the insert has a recess or cavity for accommodating the pipe connector and simultaneously allowing air to pass from the pipe connector to a downstream section of the air duct. When using the mending function, the container is just mounted in the socket, whereby the sealing is broken, and by introducing compressed air, the sealing material is forced out of the container.

25 To avoid sealing material to be driven in the direction of the source of compressed air because of a static pressure downstream of the container, it is preferred that in connection with, and downstream of the pipe connector, a check valve is provided for preventing flow from the pipe connector and in the direction of the source of compressed
30 air.

Brief description of the drawings

Embodiments of the invention are described in detail below with reference to the drawings, where:

- 5 Fig. 1 shows a front view of an inflating unit according to the invention,
 Fig. 2 shows an inflating unit according to Fig. 1, but where the upper cover is removed,
 Fig. 3 shows a section on the line III-III in Fig. 1 in a first embodiment of the inflating unit according to the invention, and
10 Fig. 4 shows the same section as Fig. 3, but of a second embodiment of the inflating unit according to the invention, and where a bottle with sealing material is mounted instead of a plug in the unit

Detailed description of embodiments

- 15 As shown on the drawings, according to the invention the inflating unit can be arranged in a rectangular and relatively flat box or cabinet **1**, which on its front is provided with an electronic switch **2** and a manometer **3** which all the time detects the excess pressure in the duct of compressed air of the apparatus and the connected parts. With the number **4** the outline of a container with sealing material is indicated, which
20 can be a latex suspension or an other known sealing agent. In this case, the container **4** is provided in the shape of a bottle made of synthetic materials. Of course other geometries and materials can be used for the container **4**. The unit, as shown on Fig. **2**, comprises an electric motor **5** with an output shaft **6**, which by a crankshaft **7** operates a compressor piston **8**. In this case, the motor **5** is a DC motor for 12 volt which without further ado can be connected to a plug for a cigarette lighter in a car, for example
25 with a plug **9** on Fig. **2** connected with a not shown wire.

- The compressed air compressor is constructed in a known manner, as the inlet valve is built into the piston **8** and the outlet valve in outlet **10** from the compressor. Thus outlet
30 outlet **10** forms the first section of the duct of compressed air, which extends from outlet **10** and forward to a tube **12** which, in a not shown way, is provided with a connector for connection to a valve on a tyre.

The apparatus is provided with a safety valve 13 and an air-escape valve 14

At the outlet 10 from the compressor, the compressed air duct is formed as an elbow pipe, which ends in a sleeve 15. Between sleeve 15 and tube 12 there is an intermediate piece 16, 16' constituting the essential part of the invention. The intermediate piece 16 is attached to the unit with two screws 17, see Fig. 2. In this embodiment of the invention the intermediate piece 16, 16' is provided with a connection 18 for the container 4 in the form of a screw socket 18. At the centre of the socket 18, a pipe connector 19 protrudes, provided with a slanting cut 20 and a sharp upper edge 24. The pipe connector 19 is part of the duct of compressed air and communicates with the outlet 10. Next to the pipe connector 19 the duct of compressed air continues at the bottom of the socket 18, here shown by the number 21.

When the inflating unit according to the invention is used for refilling a tyre, an insert or plug 22 is inserted into the socket 18. The plug 22 has an airtight abutment against the bottom of the socket 18 by means of a sealing ring 23. It can be seen on Fig. 3 that the plug in that way completely closes the admission of compressed air to the environment. The compressed air, which flows from the duct, passes into a cavity 25 in the plug 22, from where the air passes between the inner walls of the cavity 25 and the outer walls of the connector pipe 19 down to the continuation of the compressed air duct 21.

When the unit is used for mending a tyre, the plug 22 is unscrewed, and a bottle 4 with sealing material is screwed on, as the sharp upper edge 24 of connector 19 cuts through the film sealing which initially covers the opening of the bottle 4. In the same way as the plug 22, the opening of the bottle 4 is sealed with a sealing ring 23 in relation to the bottom of the socket 18. By activating the compressor, compressed air is lead into the bottle 4 and the sealing material is pressed out through the duct piece 21 and out into the tube 12.

It is preferred to arrange the unit as shown on Fig. 4 with a intermediate piece 16' where a check valve 27 is disposed between the pipe connector 19 and the up-stream sections of the duct of compressed air. In its simplest embodiment, as shown on Fig. 4

the check valve consists of a ball **28**, which in a closed position can fit into a small hole **29**, while in an open position it is pressed up against a mesh **30**, where air can pass around the ball **28** and into the pipe connector **19**. Thereby it is avoided that a static pressure in the tube **12** and bottle **4** causes the sealing material to flow back to-

5 wards the outlet **10** of the compressor.

The indicated use of a intermediate piece **16**, **16'** allows for separating the parts in order to clean the intermediate piece and adjoining parts for sealing material after having used the mending function.

CLAIMS

1. Inflating unit with sealing facilities for a tyre filled with air including a source of compressed air, where a duct for compressed air connects the source of compressed air with a filling connector, which can engage the filling valve of the tyre, as a selector device is inserted between the source of compressed air and the filling connector, where the selector device either can lead the compressed air directly from the source of compressed air to the filling connector or can leads the compressed air through a container with a sealing agent to the filling connector, **c h a r a c t e r i z e d** in that the selector device is arranged for alternative fastening of the container or an insert, where the insert is attached to the selector device instead of the container with the sealing agent when delivering compressed air directly from the source of compressed air to the tyre, and where the insert is adapted so that it can lead compressed air directly from the source of compressed air to the filling connector.
2. Inflating unit according to claim 1, where the container is provided with a neck, which can engage a socket in the inflating unit, for example by a screw connection, and where the socket comprises a perforation member for breaking a sealing in the neck of the container, **c h a r a c t e r i z e d** in that the perforation member consists of a sharp edged pipe connector provided as a part of the duct of compressed air and protruding into the socket, and where the insert has a recess or cavity for accommodating the pipe connector and simultaneously allowing air to pass from the pipe connector to a downstream section of the air duct.
3. Inflating unit according to claim 2, **c h a r a c t e r i z e d** in that in connection with, and downstream of the pipe connector, a check valve is provided for preventing flow from the pipe connector and in the direction of the source of compressed air.

Fig.1

1/2

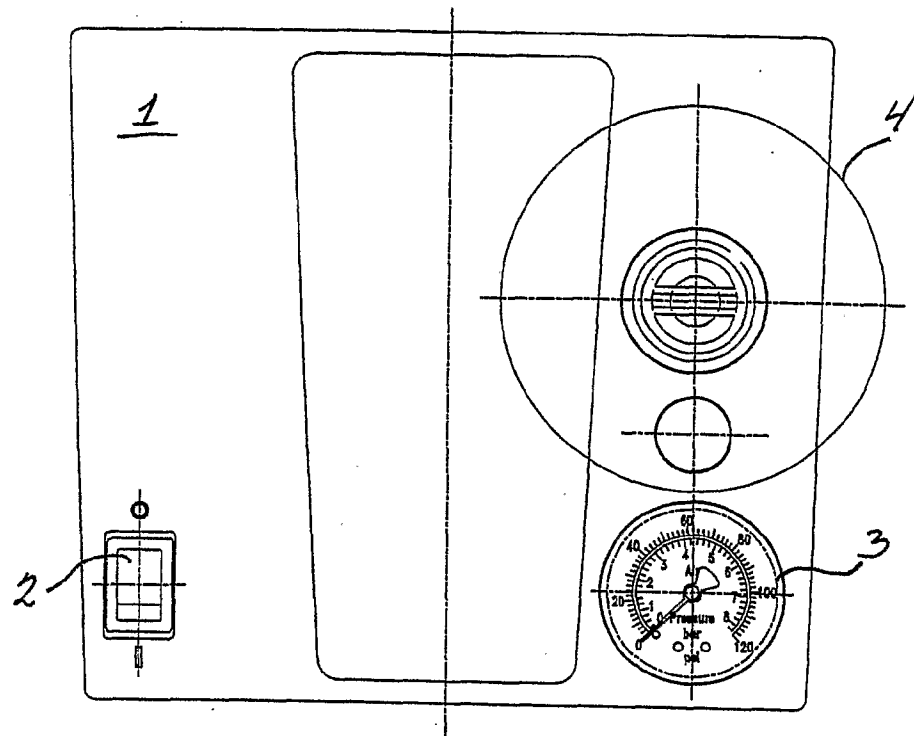
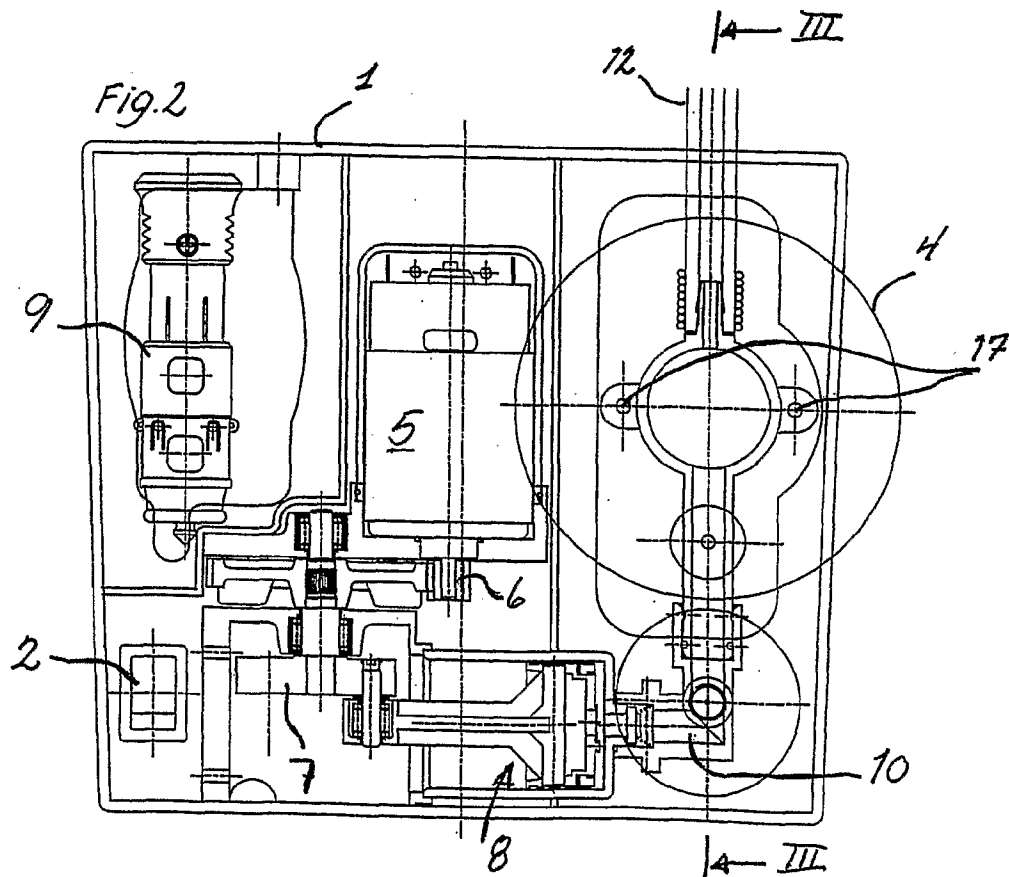


Fig.2



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Fig 3

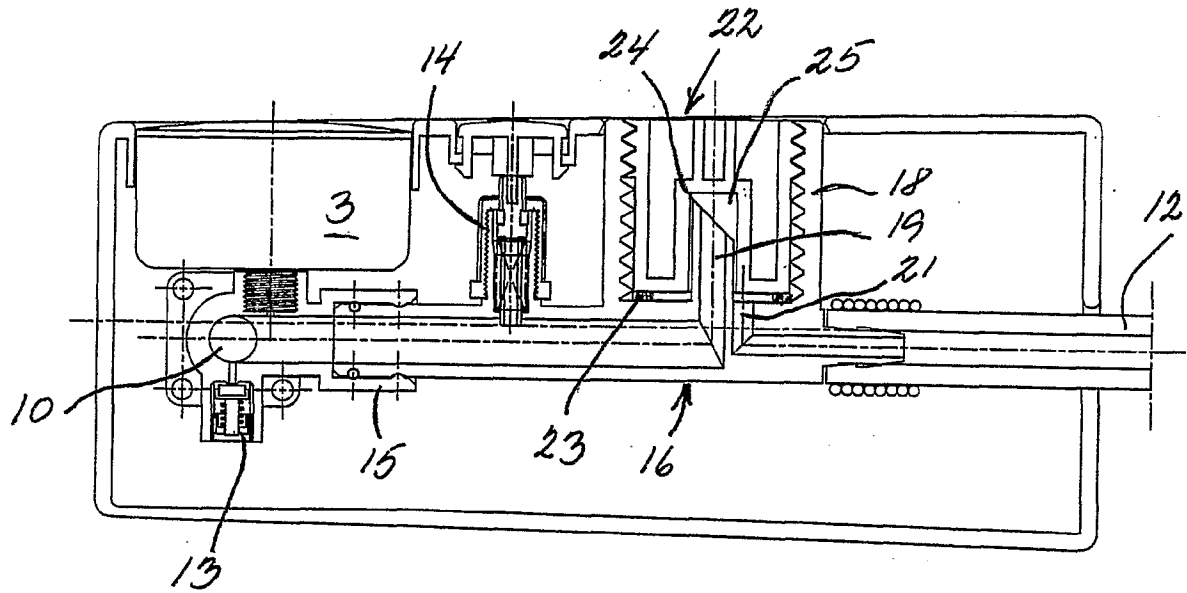
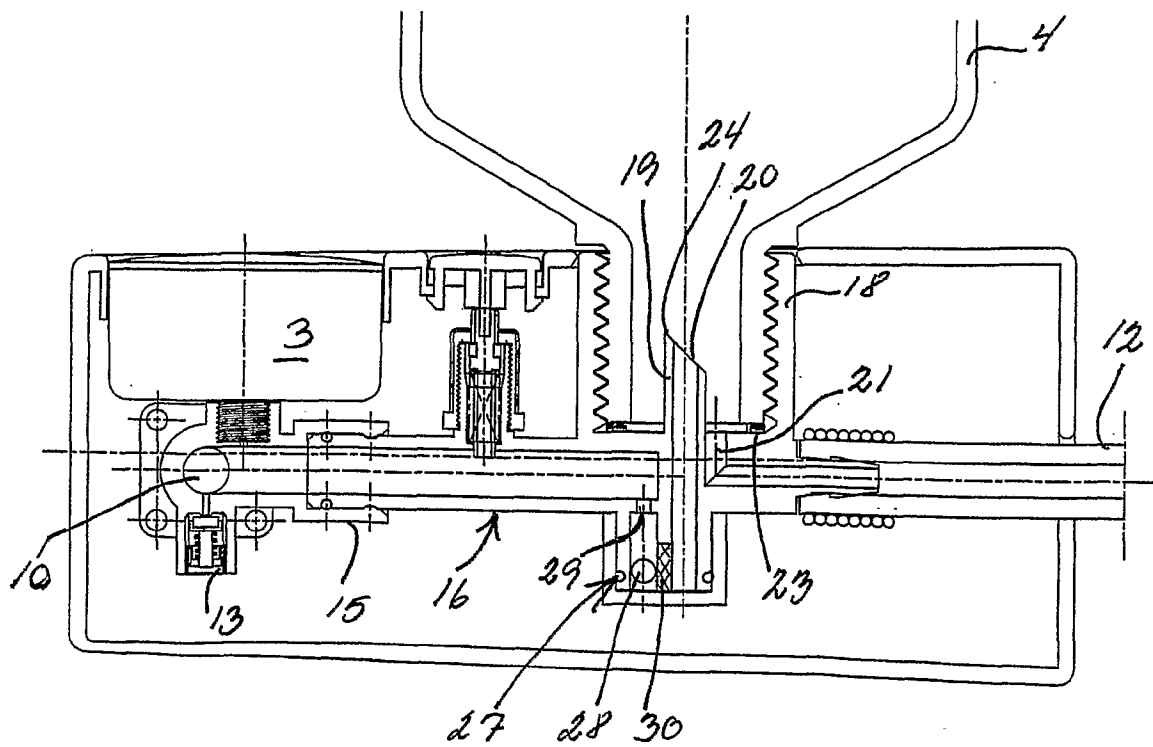


Fig 4



INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B60S 5/04, B29C 73/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B60S, B29C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	FR 2753653 A1 (CITRON MICHEL ET AL), 27 March 1998 (27.03.98) --	1
A	US 4765367 A (MARK E. SCOTT), 23 August 1988 (23.08.88) --	1
A	DE 19846451 A1 (SUMITOMO RUBBER INDUSTRIES LTD.), 13 April 2000 (13.04.00) --	1-3
A	EP 0753420 A2 (SP REIFENWERKE GMBH), 15 January 1997 (15.01.97) --	1

☒ Further documents are listed in the continuation of Box C.
 ☒ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9914031 A1 (ALUSUISSE BAYRISCHES DRUCKGUSS-WERK GMBH & CO.KG), 25 March 1999 (25.03.99) --	1
E	WO 02066236 A1 (CONTINENTAL AG), 29 August 2002 (29.08.02) --	1
E	DE 10106468 A1 (STEHLE, MICHAEL), 14 August 2002 (14.08.02) -- -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

02/09/02

International application No.

PCT/DK 02/00441

Patent document cited in search report			Publication date	Patent family member(s)	Publication date
FR	2753653	A1	27/03/98	NONE	
US	4765367	A	23/08/88	NONE	
DE	19846451	A1	13/04/00	AU 5983099 A EP 1121324 A JP 2000108215 A WO 0021875 A	01/05/00 08/08/01 18/04/00 20/04/00
EP	0753420	A2	15/01/97	SE 0753420 T3 AU 700781 B AU 720926 B AU 1131699 A AU 5830296 A CA 2181004 A DE 19545935 A,C DE 69616442 D,T EP 1123795 A ES 2166864 T JP 3210863 B JP 9118779 A ZA 9605816 A	14/01/99 15/06/00 22/04/99 23/01/97 12/01/97 16/01/97 27/06/02 16/08/01 01/05/02 25/09/01 06/05/97 27/01/97
WO	9914031	A1	25/03/99	DE 29716453 U EP 0938408 A JP 2001505501 T US 6283172 B	21/01/99 01/09/99 24/04/01 04/09/01
WO	02066236	A1	29/08/02	NONE	
DE	10106468	A1	14/08/02	NONE	